

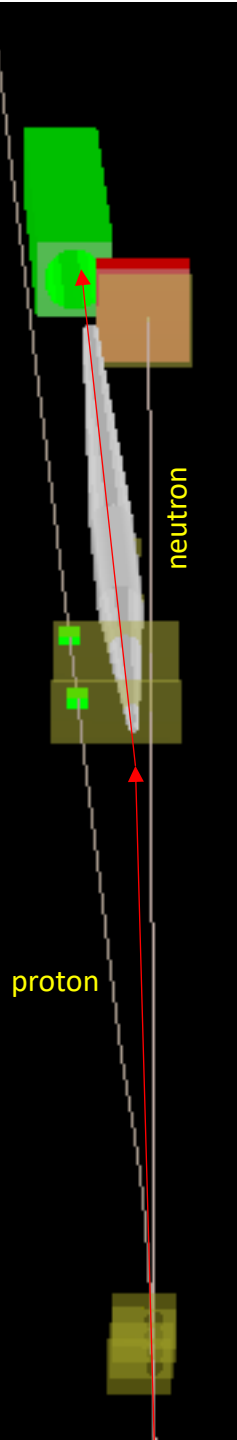
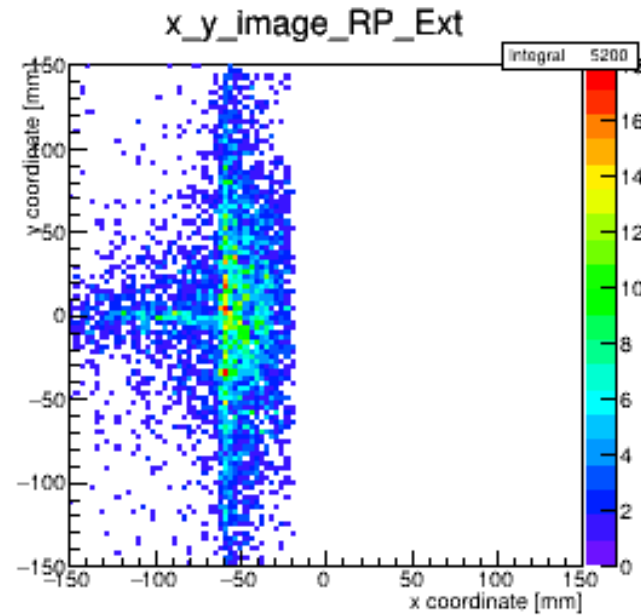
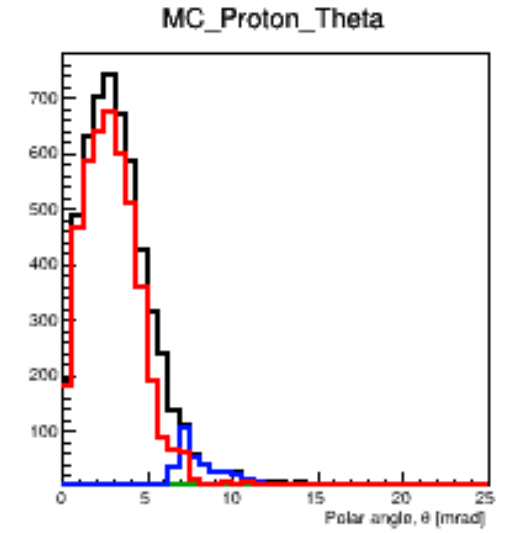
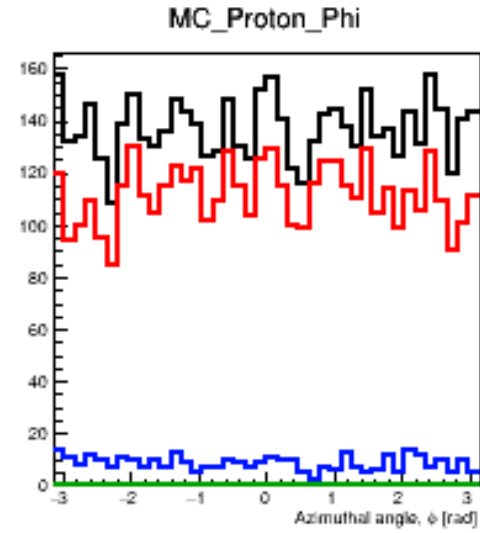
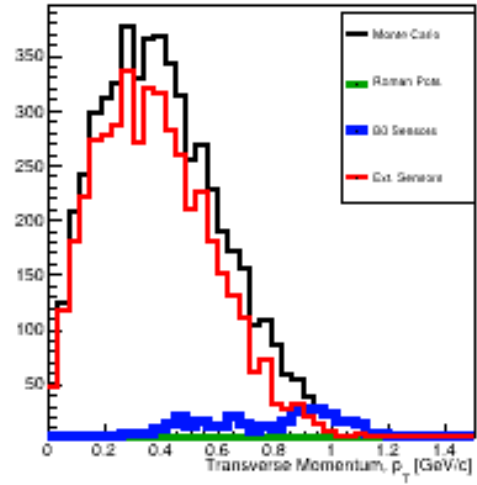
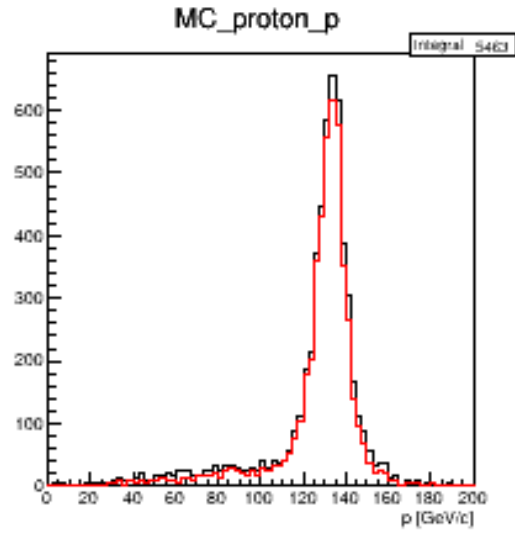
# Effect of Lattice Elements on Acceptance in Deuteron Breakup Events

Alex Jentsch

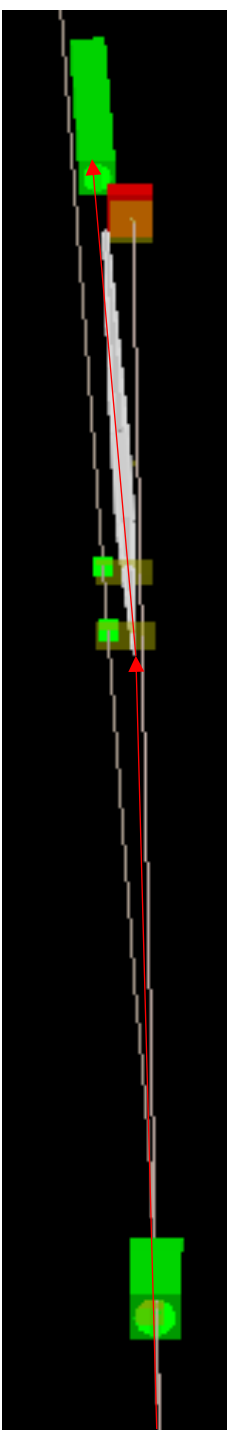
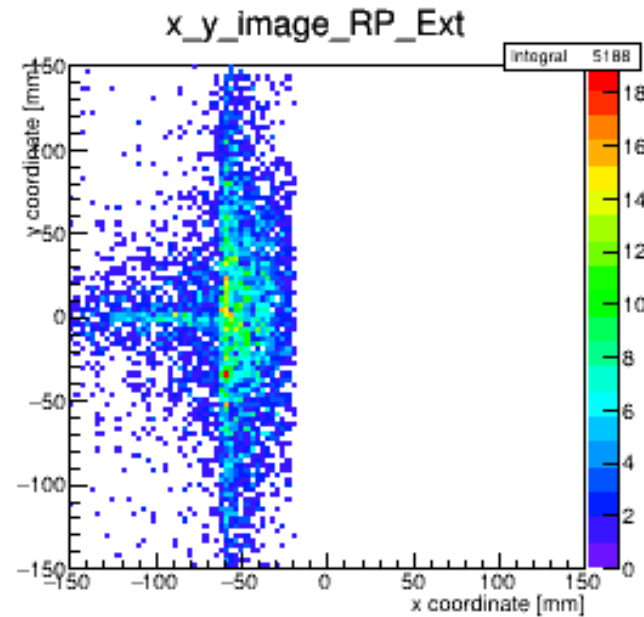
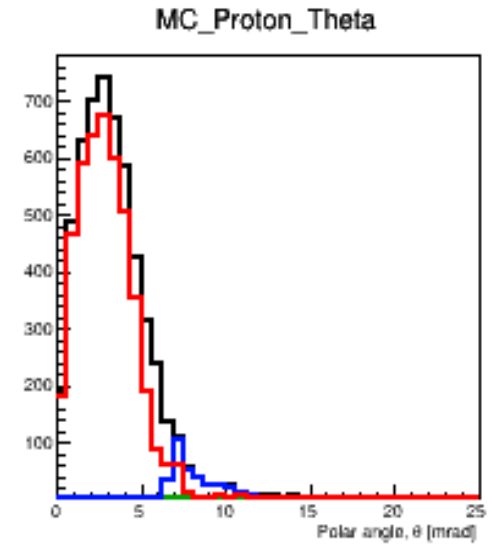
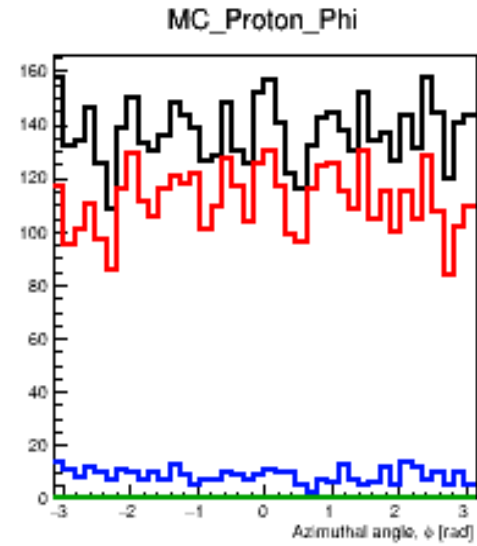
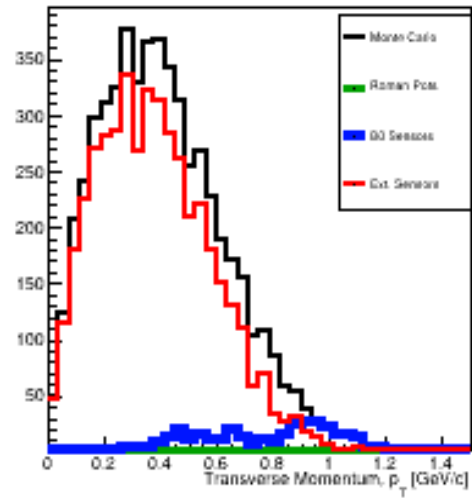
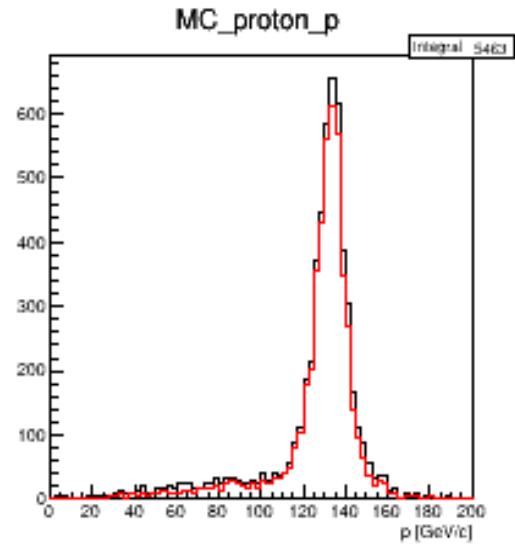
# Basic Setup

- Deuteron breakup events ( $e + D \rightarrow n + p + X$ ) produce final-state protons with  $\sim$  half (or smaller) rigidity than the beam.
  - Essentially a proton with 135 GeV of energy, while the magnets are set for 270 GeV protons (135 GeV/n Deuteron beam)
- The protons we care about exit the beamline after B1apf (or before, that's part of the discussion) and are detected by external silicon sensors.
- I will show the same results back to back with each magnet subsequently “built” into the simulation -- the integrated fields are always turned on, just the yokes are ignored.

# No magnet yokes

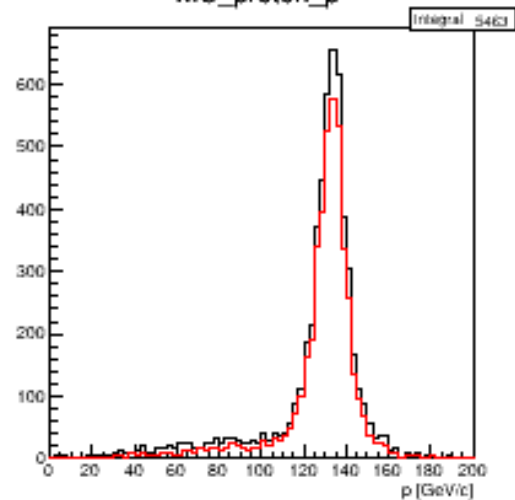


# B0pf

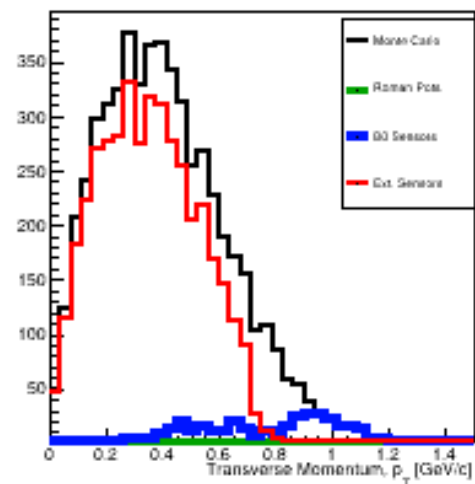


# B0pf + B0apf

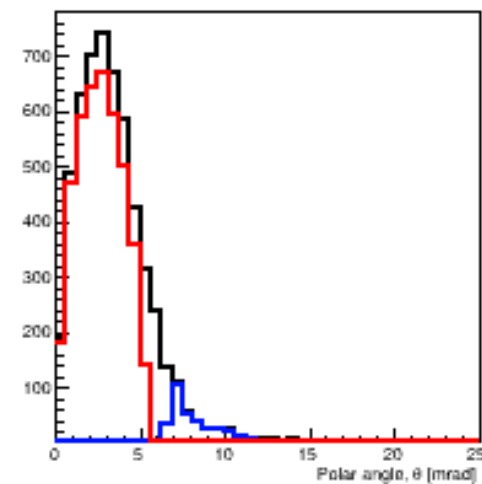
MC\_proton\_p



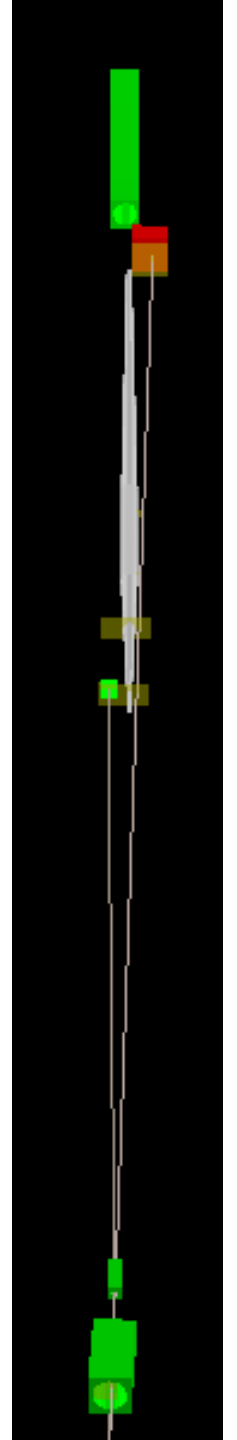
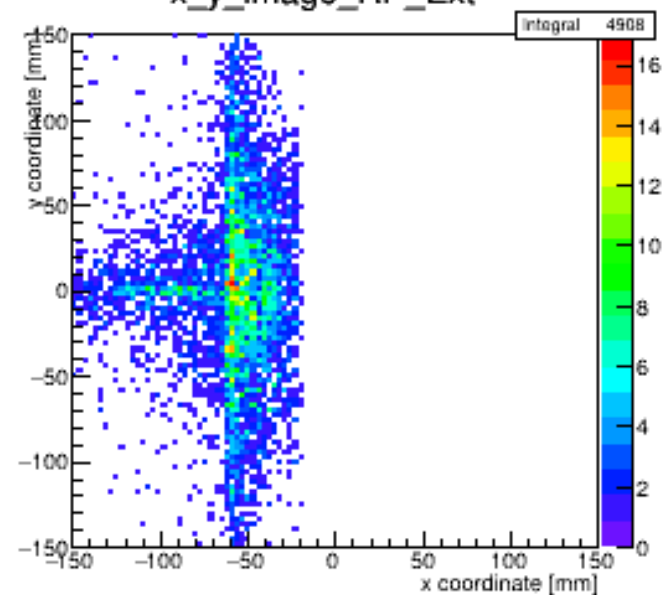
MC\_Proton\_Phi



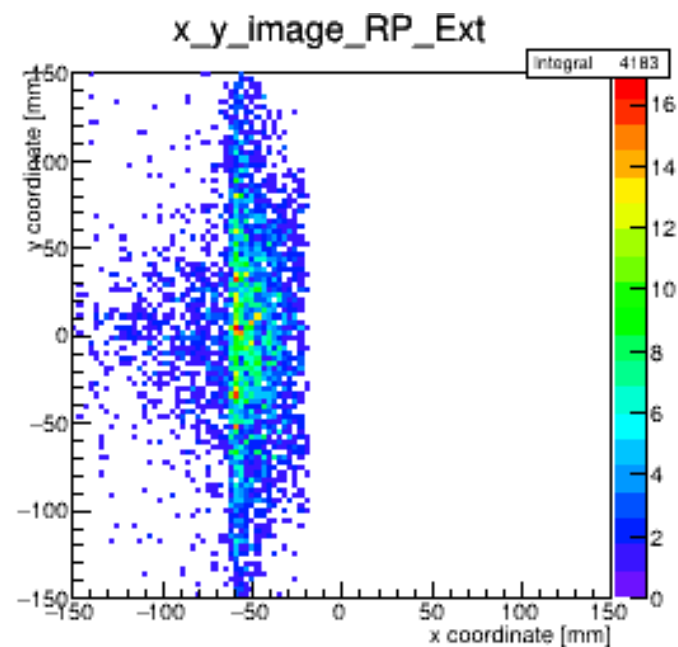
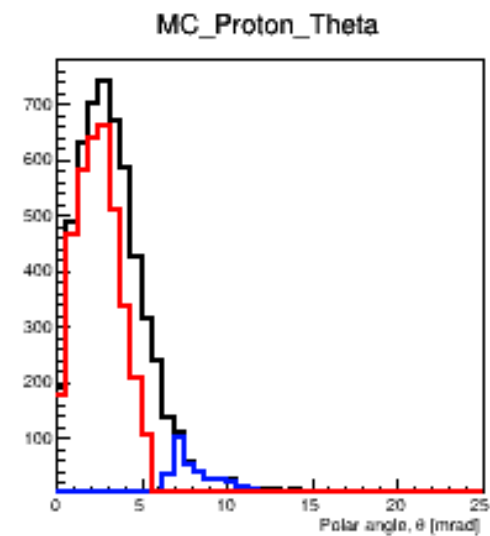
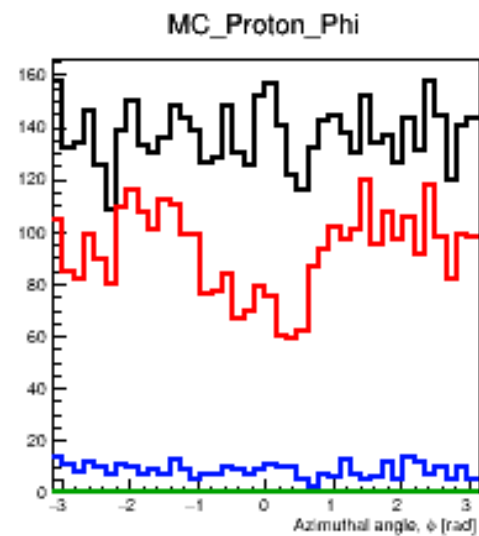
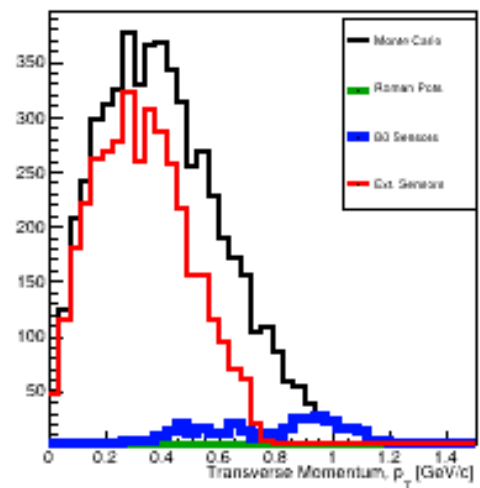
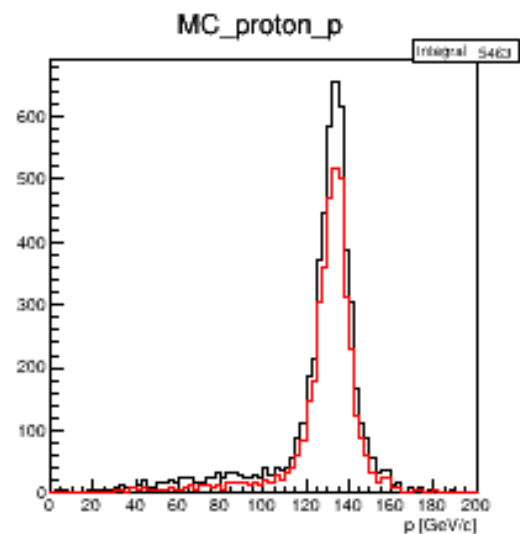
MC\_Proton\_Theta



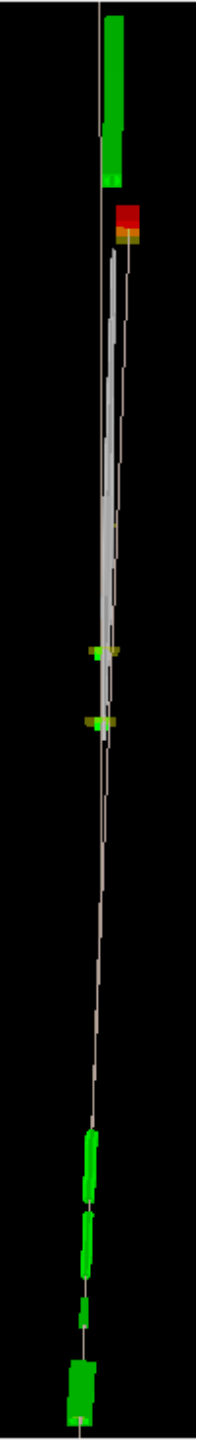
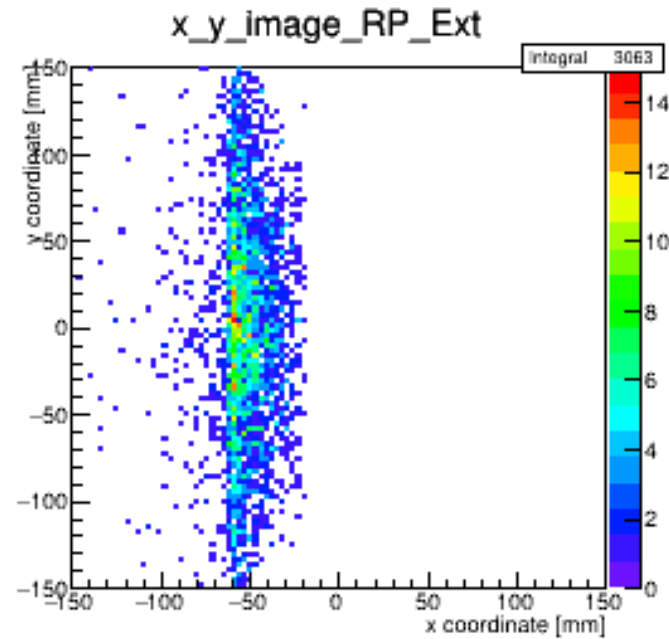
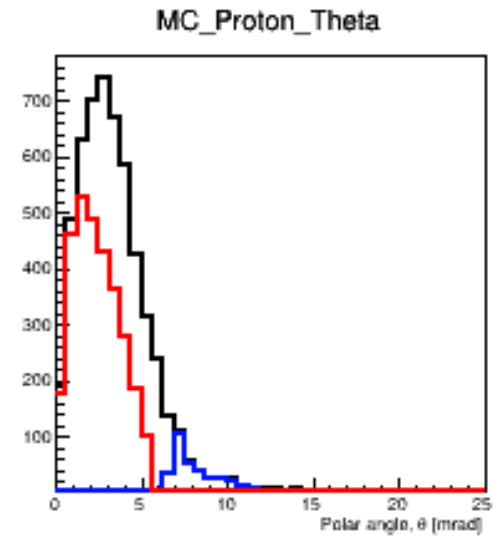
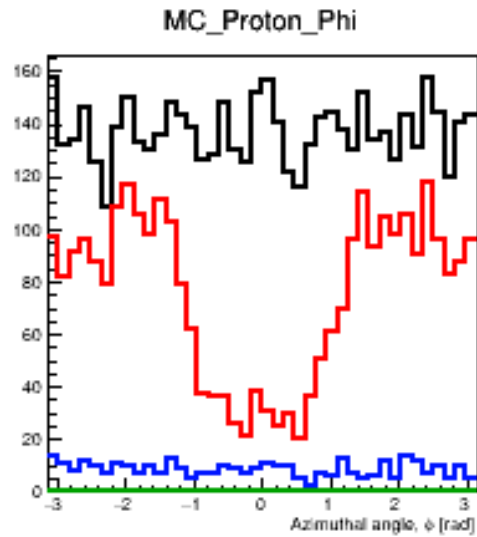
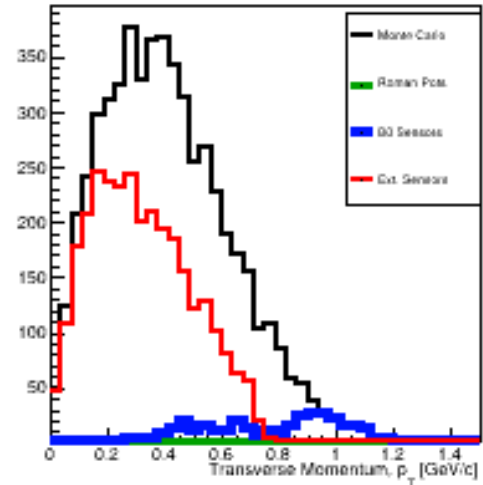
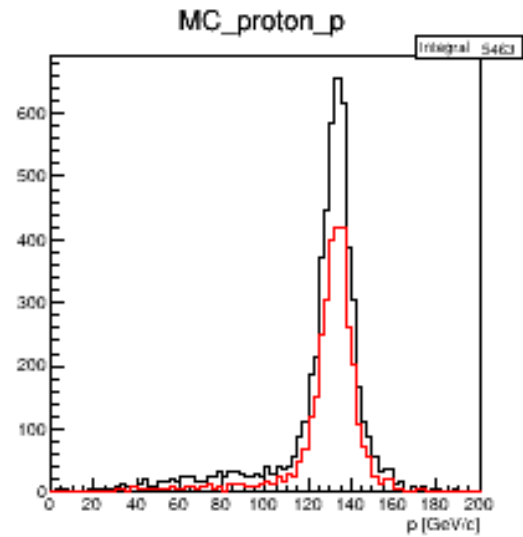
x\_y\_image\_RP\_Ext



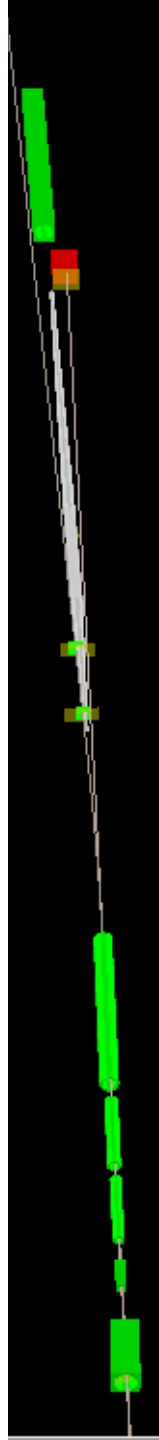
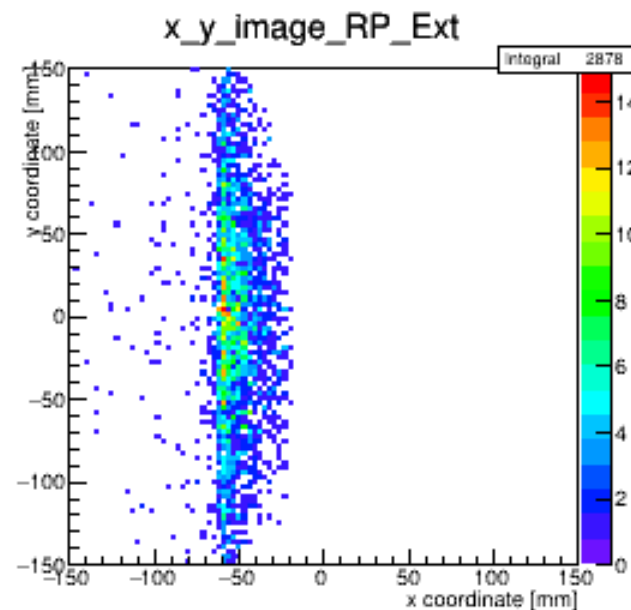
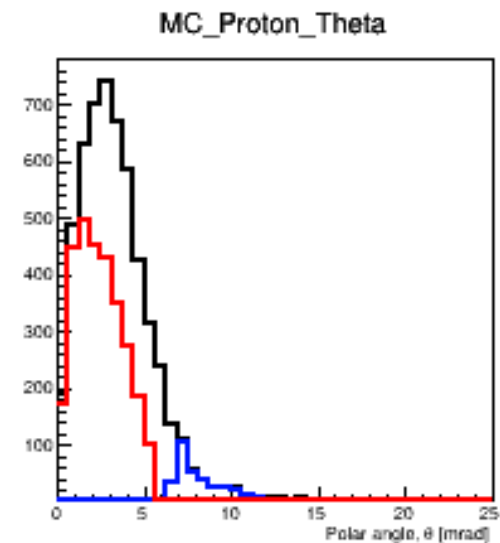
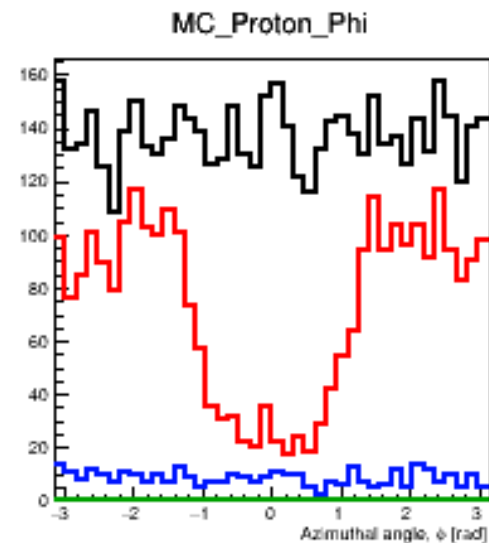
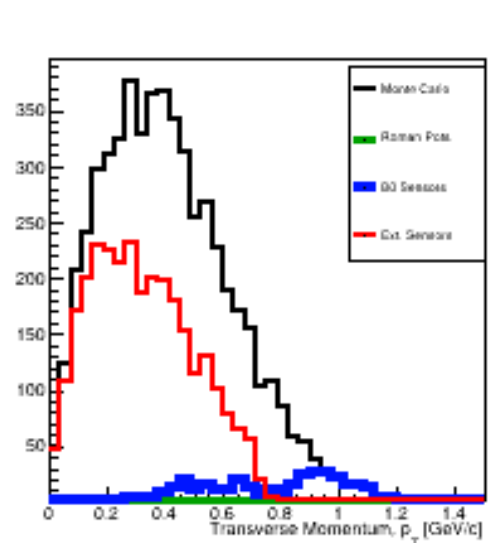
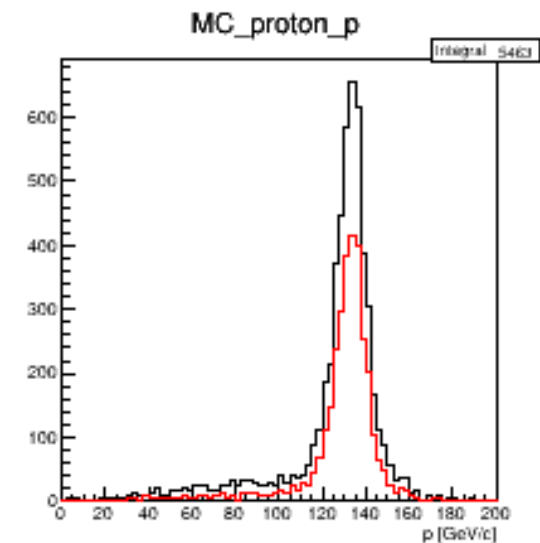
# B0pf + B0apf + Q1apf



B0pf + B0apf + Q1apf + Q1bpf

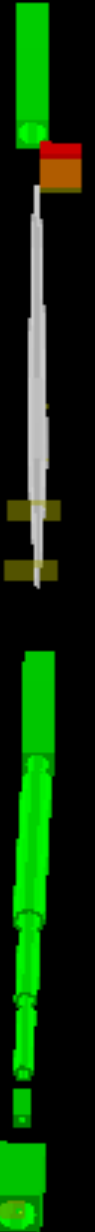
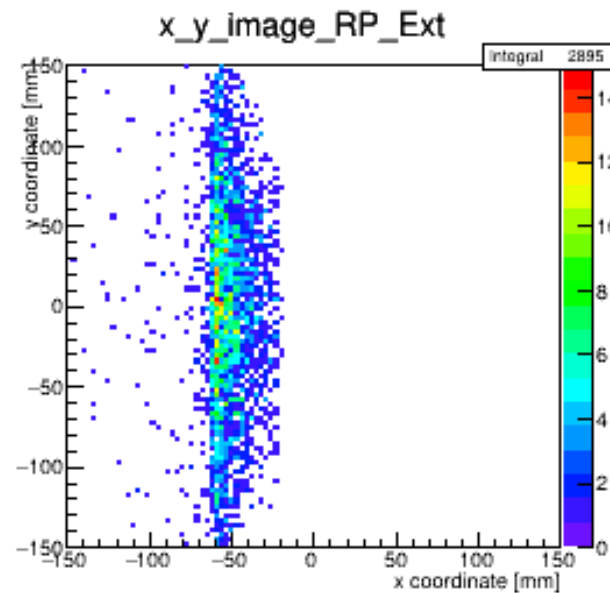
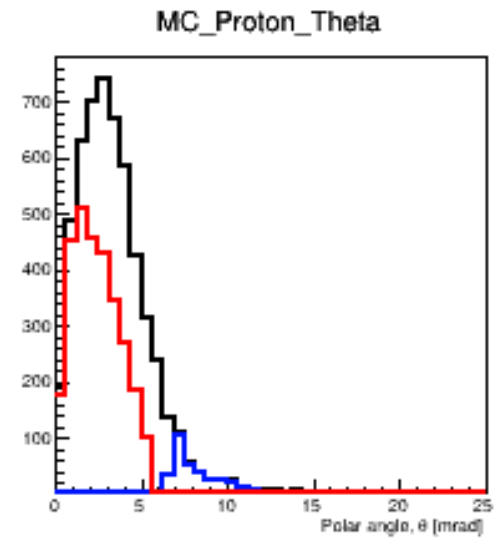
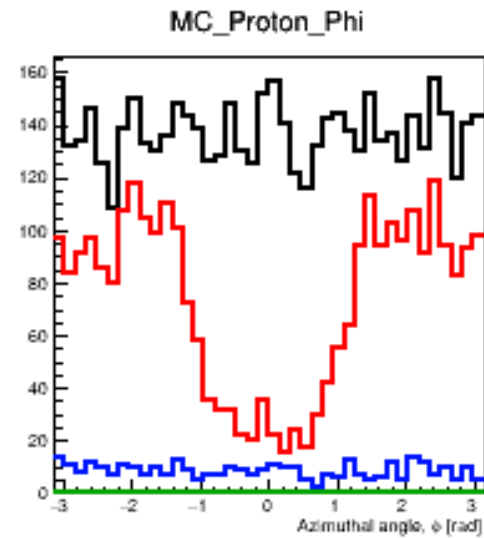
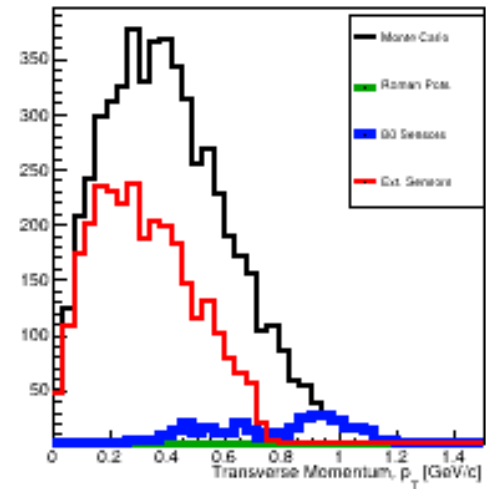
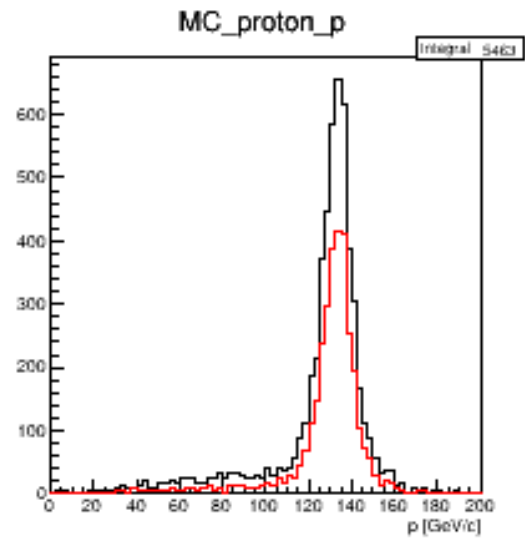


# B0pf + B0apf + Q1apf + Q1bpf + Q2pf

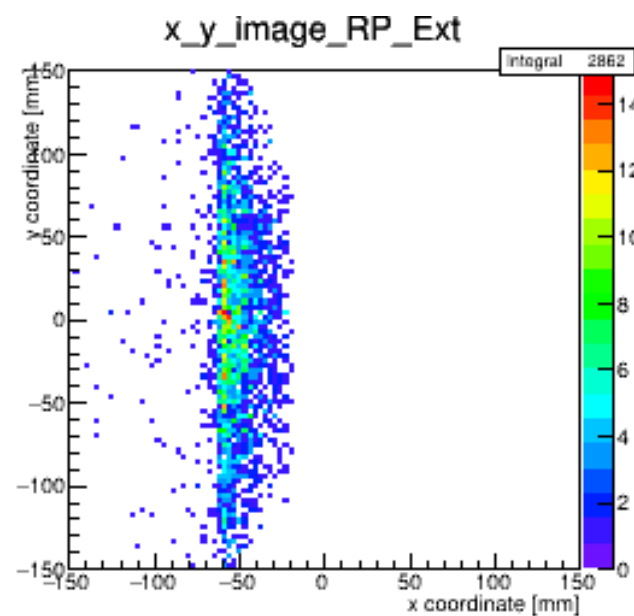
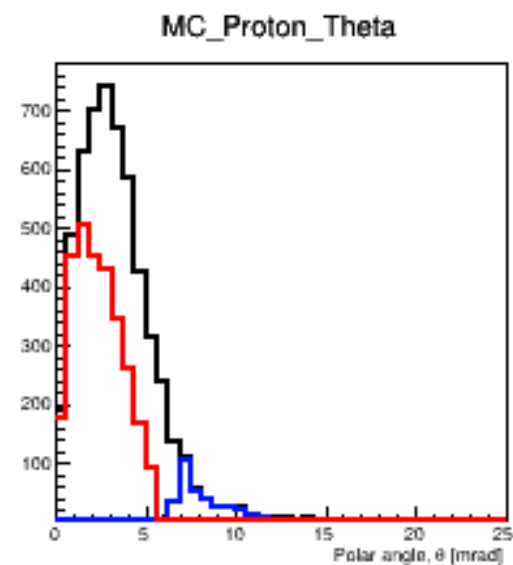
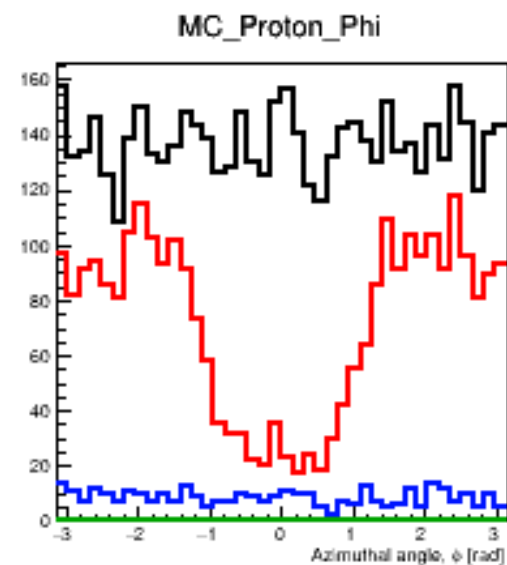
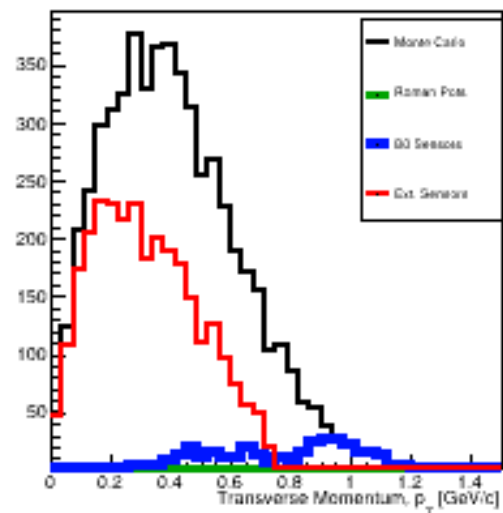
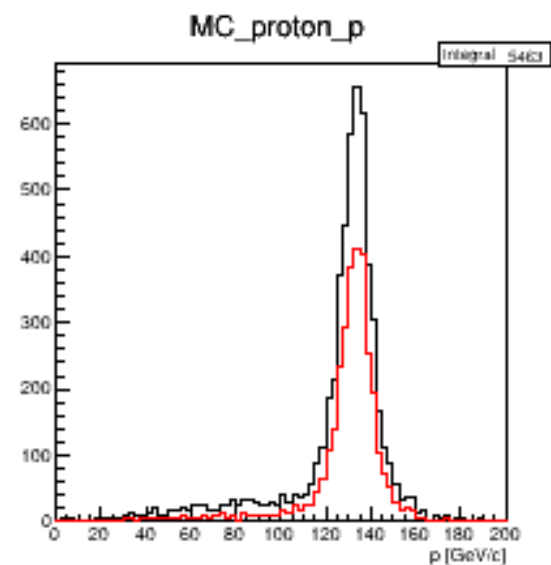




B0pf + B0apf + Q1apf + Q1bpf + Q2pf + B1pf



# All magnet yokes



# Summary

- Most particles lost in Q1BPF quadrupole magnet.
- This is because this quadrupole is vertically focusing, and therefore defocusing in x.
- For a very off beam energy proton, the defocusing effect is very strong, and these particles are steered into the wall of the magnet/beam pipe.